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Demand drives wireless installations

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Integration in Woodstock's new healthcare facility

Updated industry labelling standard

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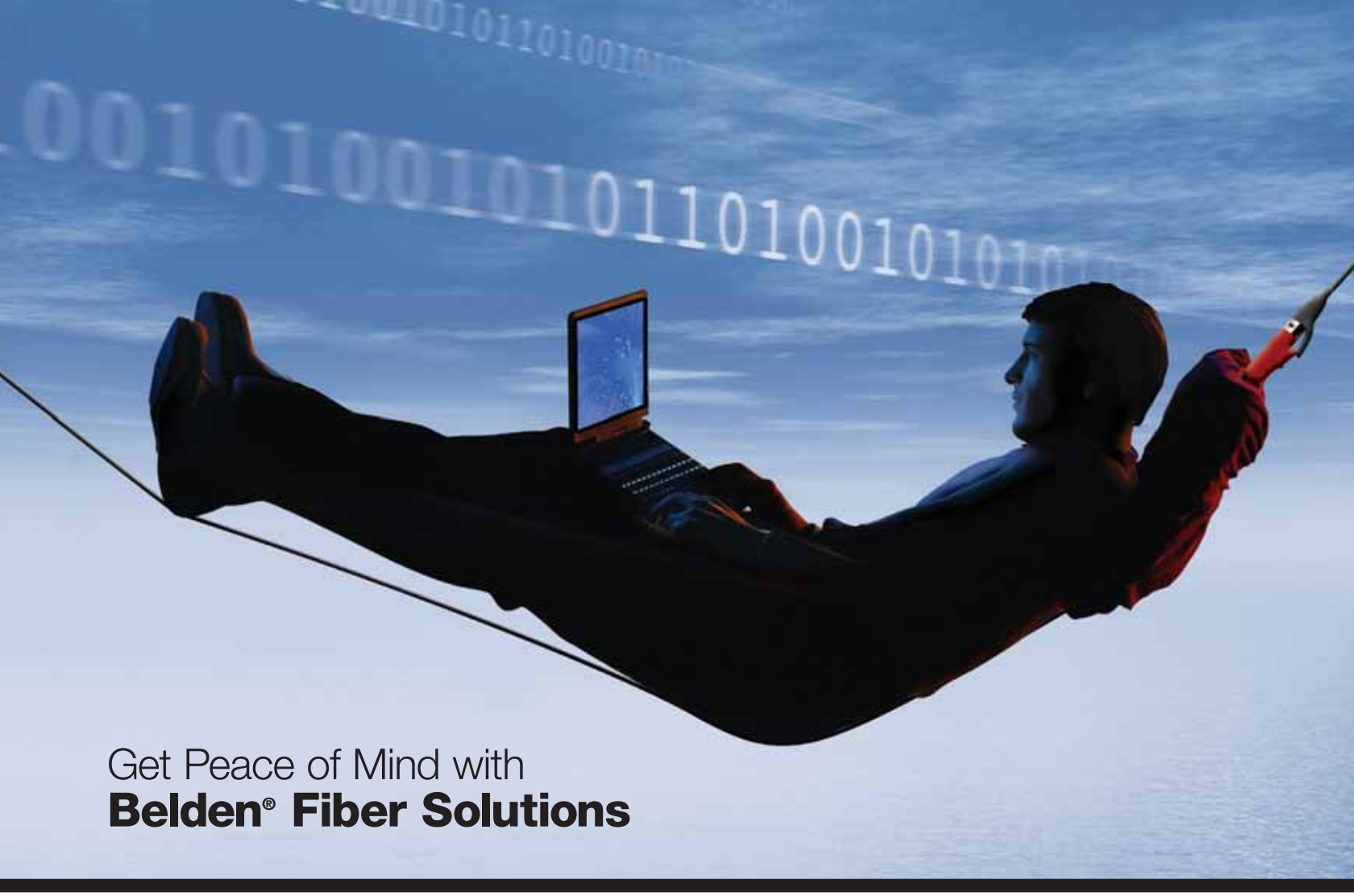

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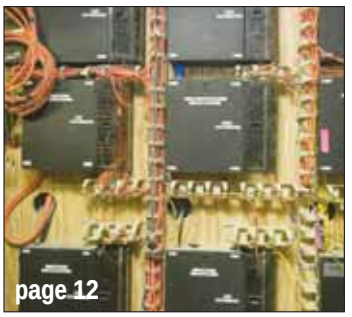
Features



12 Demand drives wireless installations

User demand is driving wireless installations, though some challenges must still be overcome with each wireless application. While most owners want to provide the most they can to their employees and customers, they are limited by what they can afford and, many times, extensive systems are sacrificed due to cost.

14 Network design for the security professional

For security integrators, robust and proficient network design is the foundation upon which all successful subsequent network implementation is built. Without appropriate knowledge of the security apps, the network cannot be designed; it is essential that the integrator play a key role in overall network design and implementation.

16 Updated industry labelling standard adapts for pre-terminated installations

What's in a label? As pre-terminated cabling installations gain in popularity, ANSI/TIA/EIA-606-B must adapt to consider how to administer and document a pre-terminated world.

18 Total care: integration paves the way for Woodstock's new healthcare facility

Honeywell is delivering a Total Asset Management (TAM) program to the new Woodstock General Hospital, which recently broke ground. Besides providing service, maintenance and security for the facility, Honeywell will also help design and install the building automation, security and life safety systems.

Departments

Anthony Capkun

There's more to committees than just committees

I am simply amazed by the talent and experience you can find at an industry committee meeting. I'm not referring to committees of volunteers that conduct bake sales or church bazaars, or what have you. No, I'm referring to the volunteers who make up the various BICSI committees (though I imagine other industry committees, like TIA or IEEE, are much the same).

What's refreshing about BICSI committees, though, is that when they tell you "Please join us" or "There's always room for one more" or "Our committees have an Open Door policy", they really mean it.

At the last BICSI Conference in Las Vegas earlier this fall, I decided to check out some of these meetings. (I would have visited them all but for scheduling conflicts.) True to their word, no one stopped me from entering. No one questioned my attendance. No one feared to speak because there was "a reporter" in the room. They simply went about their business, and even invited me to participate wherever I could.

You see, the people who volunteer for these committees (and many volunteer at more than just one) are single-minded of purpose: they want to see improvement. They want to make things better, and they've realized that the best way to do that—though it does add to their workload—is to get in on the ground floor where courses are charted and decisions are made.

Rather than complain about the state of this or the confusion surrounding that—rather than wait for someone else to do something—they get together and make change happen.

Granted, to the outside observer it may seem as though as some discussion points are completely irrelevant, and you find yourself wondering, "Why the hell are they even talking about this?", yet it all makes sense when you see the whole picture. At the Codes Committee meeting, for example, a discussion point arose regarding the wording in one of the standards that dealt with the installation of communications wall outlets. The wording in question was (and I'm paraphrasing): to be installed in an *accessible location*.

Which all seems fine and good, and pretty straightforward... *but accessible to whom?*

When you think about it, that's not nit-picking but a rather valid discussion, especially when you consider these same documents are used by inspectors who pass or fail installations.

Or take the Membership & Marketing Committee meeting, where a lot of time was spent on discussing ways of improving return on investment for both individual and corporate members. Or the Home Technology Committee meeting, where there's a desperate need to get additional, knowledgeable volunteers to help draft a standard for residential installations.

And while there are manufacturer reps at these meetings, there are a lot of individuals representing no one's interests but their own and those of industry in general.

So next time you want to see something changed, don't just sit back and wait to see what happens. Get in where changes happen and make a difference. nc

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Discrete manufacturers eye wireless developments in process

Manufacturers in the automotive, aerospace, electrical, electronics, machinery and other discrete industries are closely watching recent wireless developments in the process industries in hope that at least some of it will address their own requirements.

Process industry developments, such as the introduction of a wireless version of the HART protocol for process sensors—plus the ISA 100 initiative for wireless process sensing—are of significant interest to discrete manufacturers, but numerous differences between discrete versus process requirements will limit their applicability, according to a new ARC Advisory Group study.

"While the business drivers are in place, including wireless' status as 'the ultimate Fieldbus' from the perspective of wiring reduction, the lag in technology and standards development suitable to meet discrete industry requirements will contribute to an ongoing fissure in growth prospects for discrete versus process industries over the next five years," said ARC vice-president Chantal Polsonetti, the principal author of ARC's Wireless Devices in Discrete Manufacturing Worldwide Outlook.

"Divergent issues such as higher-speed discrete processes that cannot tolerate the latency times of current wireless communications and the longer potential timeline for standardization at the sensor/actuator level are just a few of the potential detractors to potential growth," she added.

The prospect of a cable-free interface for use in control and data acquisition applications has the potential to significantly impact discrete manufacturing in core areas such as productivity, performance and cost reduction. Wireless technology enables these improvements through its ability to lower engineering costs, enable remote and/or mobile operations, add flexibility in the form of incremental improvements or changes to existing installations and, in general, provide cable-free access and operation. Wireless technology can also bring powerful incremental control and monitoring capabilities to a process, serving production data up to enterprise applications and enabling ongoing improvements in productivity and operational performance.

Discrete manufacturers are often among the first companies pursuing leading-edge, advanced, often data-hungry processes to improve performance and/or remove human intervention (and the variability it brings). This type of automation, such as flexible manufacturing platforms in automotive, often requires a significant amount of incremental monitoring, sensing and actuation of robots and their associated handling and control systems as they go through numerous production changes. In these instances, the use of wireless products not only reduces cable failure in moving equipment, it enables the addition and monitoring of incremental I/O and devices.

The standard configuration of WLAN and Bluetooth in mobile computing devices today points to their role as flashpoints in the trend toward wireless convergence in the market as a whole. This role will only expand as GSM and cellular networks are added to the PAN and WLAN interfaces already supported. Compliance requirements for time/date/location stamps that track movement of hazardous and other materials throughout a facility are a key driver behind this expanding convergence, while location-based services and RFID will be among the next requirements.

For more information on this study, visit www.arcweb.com. Click Market Research under Our Services.

Communications Test Design acquires Phoenix Wireless

CTDI—a telecom repair and logistics service provider—acquired Phoenix Wireless, a provider of wireless communications and electronics accessories. The acquisition is strategic to CTDI and Phoenix based on financial, operational and customer synergies, said CDTI.

The acquisition will enable Phoenix to expand its product and service offerings through CTDI's capabilities, which include engineering and distribution expertise via more than 3800 employees and 39 distribution centres in North and South America, Europe and Asia.

Following the acquisition, Phoenix will continue to provide products under the Phoenix brand. Phoenix will operate under CTDI's Products Division, bolstering the company's portfolio of access products.

Both Phoenix's management and facilities will be retained following the acquisition. It will manage its customers' sales, service and product needs without changes to existing processes.

BICSI promotes LEED credit development

BICSI—an association supporting the information transport systems (ITS) industry—is working with the U.S. Green Building Council (USGBC) to develop strategies for the recognition of technology infrastructure-related innovation credits in the Leadership in Energy & Environmental Design (LEED) Green Building Rating System.

Reps from BICSI met with USGBC back in March to create an awareness of the ITS industry's manufacturers and contractors with products and processes that could apply for LEED credits—if only technology credits were to become a part of the existing LEED rating system.

USGBC suggested BICSI create a consortium of industry reps to create the necessary technology credits for LEED. The members of this consortium have already made comments on where possible technology credits could be included in the Innovation in Design section of LEED 2009.

PEOPLE FINDER

Alex Smith, RCDD, president of **Connectivitywerx**—and **Network & Cabling** editorial advisory board member—announces Connectivitywerx is now a **Panduit Certified Installer–Gold Level.** "After installing and supporting Panduit cabling systems for many years, I am very pleased that Panduit has approved us to participate in their PCI program," said Smith, adding he looks forward to being able to provide fully certified Panduit Unified Physical Infrastructure Solutions to clients.


Frédéric Bougard

John Sencich, vice-president, Utility & Other, with **Thomas & Betts Canada,** announced the promotion of **Frédéric Bougard** to national sales manager, communications. In this newly created position, Bougard is responsible for all aspects of sales and marketing of the Thomas & Betts product offering to the growing Canadian CATV, telecom and security markets. Prior to this appointment, he served as sales representative for communication products.


John D. Clark Jr.

John D. Clark Jr., CAE is the new executive director and CEO of **BICSI**—an association supporting the information transport systems (ITS) industry. He most recently served as president/CEO for the Society of Cable Telecommunications Engineers (SCTE). Clark is a former marketing executive with more than 28 years of experience in the cable and telecom industries.


Richard Smith

Meantime, BICSI members have chosen five of their own to serve two-year terms on the board. Among them is **Richard Smith, RCDD, NTS, OSP,** the incumbent Canadian Region director. The new officers will be inaugurated at the January 2009 Winter Conference in Orlando, Fla.


Vince Pesce

Nathalie Pilon, president of **Thomas & Betts Canada,** recently announced a couple appointments. **Vince Pesce, C.A.,** is now vice-president, finance. Since 1991, Pesce held the position of senior manager, assurance practice at KPMG (where he was employed for 10 years prior to joining Thomas & Betts in 2000 as controller, planning and analysis). He is now responsible for all aspects of the company's financial operations. Meantime, **Alain Quintal, Eng.,** is now T&B's vice-president, manufacturing & technology. Quintal joined T&B in September 2007 with a 20-year track record in the manufacturing industry—most recently as vice-president, operations with Rolls-Royce Canada. His responsibilities include all aspects of the company's manufacturing operations.


Alain Quintal


Brian Sorensen

Leviton has promoted **Brian Sorensen** to director of national distribution accounts for the company's commercial data networking business. In his new post, he directs the strategic growth of Leviton's complete line of voice and data devices, building relationships with key channel partner and end user markets. Sorensen joined Leviton in 2006 as manager of national accounts; his previous experience includes positions with Tyco Electronics/DEK.

ADC named two members—**Krish A. Prabhu, Ph.D.,** and **David A. Roberts**—to its board of directors. The appointees increase the ADC board to 12 members to ensure a smooth transition, says ADC, in connection with the retirement of **John A. Blanchard III,** and potential retirement of one or more other directors over the next few years. Prabhu most recently served as CEO of Tellabs Inc., and possesses years of experience at Alcatel-Lucent and AT&T Bell Laboratories. Roberts is a manufacturing and general management executive who has served with companies such as FMC Corp., Pitney Bowes Inc. and Graco Inc. He currently serves as chair, president and CEO at Carlisle Companies Inc.

The **SCTE Foundation** announced the election/re-election of officers for its board. Re-elected are: **Keith R. Hayes** of Charter Communications, president; **Greg Allshouse** of Comcast Cable Communications, treasurer; and **Mike Phebus** of Jones/NCTI, secretary. **Marv Nelson,** interim president/CEO of the Society of Cable Telecommunications Engineers (SCTE), was elected as foundation vice-president, replacing **John Clark,** SCTE's former president/CEO. Meantime, CommScope's **Jim Hughes** was appointed chair of the Fundraising Committee, also replacing Clark.


Troy Goodnow

Troy Goodnow has been named program manager of field services for **Kitco Fiber Optics,** a provider of connectorization products, as well as training and consulting services.


Carlton J. Cottuli

Carlton J. Cottuli has been named vice-president of product development and services for **Wright Line,** a manufacturer of operator consoles, electronic and server enclosures, office and other specialty furniture. With over 20 years of experience, he comes to Wright Line from American Power Conversion (APC), where he served as vice-president of the Data Center Science Group. Colutti also spent 10 years at Russelectric Inc., serving as power protection manager.

Louis Audet, president and CEO of **Cogeco Cable,** announced the resignation of **Dave Dobbin,** president of Cogeco Data Services, who's left to pursue new career goals with a new telecom start-up. his successor has not yet been appointed.

Q | *What are key considerations when selecting Ethernet copper patch cords?*

By Lisa Chan

A | There are five key considerations when selecting Ethernet copper patch cords to maximize patch cord manageability, channel performance and cost savings.

1. Electrical specification
Cat 5, 5e and 6 patch cords are the most common, with performance determined by the lowest category component used in the channel. Installing a Cat 5 patch cord in a Cat 6 cabling channel, for example, results in just Cat 5 end-to-end performance. However, installing Cat 6 in a network of lower specification does not degrade performance, as they are typically backward compatible.

It is always desirable to match patch cords with the cabling system to obtain highest performance at the lowest cost, but since quality patch cords can last 20+ years, consider installing Cat 6 or higher in anticipation of future needs.

2. Length
Patch cord prices rise as lengths increase; however, while keeping a patch cord to its shortest necessary length can save material cost and create a neat-looking communications room, cords that are *too short* will pull on connectors.

For efficient routing, find the best path between the ports to be connected. When planning a cord for cross connection, the best route is usually the shortest to the horizontal and vertical cables guards that is not obstructed by other cords and connectors in the panel. Having established the best route, the minimum requirement length can be found by adding the horizontal and vertical distances. 5 in. of slack should be considered as the maximum tolerance level for the sake of aesthetics and manageability. Implementing optimum lengths is always the best practice.

(Some manufacturers define cord length as the length of the cord excluding the plugs, while others include the plugs in the measurement, though the former method is more appropriate. And while the difference between the two is often negligible, special care should be taken when longer-length precision is required. Short cords, especially those below 1 ft, can magnify this disparity.)

Using the proper patch cords, techniques and procedures helps you get the best results for your communications infrastructure.

3. Colour
Over 20 different colours are available in the market for enhancing identification and increasing manageability, but too many colours can create confusion and impact tidiness. It's a good idea to keep the number of cable and patch cord colours down to three.

4. Plug
The most common plug for datacom is the RJ45. The qualities of the contact material and the plating of a plug are important performance factors; for example, a quality plug will help you overcome NEXT (near-end crosstalk) interference. Physical plug enhancements—such as anti-snag, colour, ruggedized, keyed and lockable—should be considered, depending on the application.

5. Flame rating
The Canadian Electrical Code (CEC) requires communications wires and cables be listed according to their fire-resistance rating (as determined by outfits such as UL), and marked according to the environment in which they may be installed. The most common markings are CMP, CMR, CM and CMG.

CMP cables are suitable for plenum and other spaces used for environmental air. CMP measures maximum peak optical density and flame spread. This patch cord has the highest flame resistance of its brethren, including LSZH described below. *CMR cables* are suitable for vertical runs (in a riser or floor-to-floor). CMR measures fire resistance for floor-to-floor flame spread. *CM and CMG cables* are for general purpose use (neither plenum nor riser). CM and CMG measure resistance to the spread of fire.

Used mainly in Europe, LSZH (low-smoke, zero-halogen) cable meets several standards set by the IEC (International Electrotechnical Commission). It burns slowly when ignited, and the smoke it produces is less toxic than that of its counterparts.

Much to choose from
Patching is a key part of a successful network. Using the proper patch cords, techniques and procedures helps you get the best results for your communications infrastructure, ensuring the performance of your network's connectivity and manageability.

Lisa Chan is product manager, Copper Apparatus, with CommScope Inc.

The spectrum of fiber optic test equipment

By David Green, P.Eng.

With increasing demand for network bandwidth, enterprises are upgrading their IT infrastructure with fiber components. This is an opportune time for cabling professionals to augment their toolkit for fiber, including tools for: inspection, cleaning, testing and certification & troubleshooting.

Inspection

For data to be transmitted and received successfully on the distant end, pulses of light travelling across fiber must be received with sufficient power to be measured. Two of the most common causes of power loss within the physical medium (yet easiest to prevent) are damaged and dirty fiber end-faces.

Sources of contamination can be the touch of a finger or a brush with clothing, let alone dust or static-charged particles in the air. A quick visual check of end-faces is insufficient for verifying cleanliness when the cores of these fibers are extremely small, ranging from roughly 9µ to 62.5µ (roughly 1/10 to 2/3 the size of a human hair). With such a tiny core size, it is impossible for any end-face defects to be spotted without the aid of a microscope.

There are two types of fiber inspection microscopes: optical and video. The first allows you to inspect the end-faces directly (though not inside equipment or through bulkheads), while the latter is used to examine ports in hard-to-reach places. (They are also safer, as the eye views an image of the end-face on-screen, reducing exposure to potentially harmful radiation.) The primary desired attribute is *detection capability* (the smallest-sized object the microscope can detect), which should be balanced against the display's viewing area.

Cleaning

Properly cleaned end-faces can reduce attenuation by more than 50%, so choose cleaning tools and methods wisely. Do not use canned air to blast fiber connectors or ports because it is ineffective on oils, residues or tiny static-charged particles. Cloth wipes can leave trace amounts of lint and dust-attracting static.

Cleaning resources vary in complexity and price, from simple wipes to devices that incorporate ultrasound with water. For most cabling jobs and projects, the pairing of lint-free wipes and swabs with engineered solvents now found in fiber inspection, certification and cleaning kits is sufficient.

Certification & testing

After splicing, terminating or mating clean end-faces to create a fiber plant, you must ensure the attenuation of the link meets specified standards. TIA prescribes a two-tier certification test.

The first is to test a fiber link for overall loss, length and polarity, which is typically done with an optical loss test set (OLTS) or power meter/light source (PMLS). Though not required, the second tier measures the loss at each connector and splice, and this is done with an optical time domain reflectometer (OTDR). (Recent equipment innovations include fiber modules that augment copper testers with OLTS and OTDR functionality.)

The combined use of an OTDR with an OLTS for Tier 2 testing is recommended because it can see the loss at each event, such as a break, splice, connection or bends. As such, OTDRs can certify the fiber link by quickly evaluating and documenting the test results against the project's design parameters.

Troubleshooting

To troubleshoot and analyze defects, an OTDR is plugged into one end of a link where it sends pulses of light down the fiber. Portions of these pulses are reflected back in the form of backscatter or reflectance from connections, cracks, splices, breaks, sharp bends or the end of the fiber. They are shown graphically on the OTDR's display.

You used to have to have someone with expertise in analyzing an OTDR's results, but no more: newer equipment is easier to use, with intuitive interfaces and automated, pre-installed tests taking only seconds to complete.

A visual fault locator (VFL) is a simple, compact first-line troubleshooting tool. It uses a bright red laser to illuminate the fiber and identify a link's high-loss points in addition to verifying polarity and continuity.

Contractors, technicians and network owners can verify and maintain the quality of their fiber links with the right test tools for inspection, cleaning, testing, and certification & troubleshooting. NC

David Green is Fluke's director of marketing (AmPac Region) as well as its education program manager. A member of Network & Cabling's editorial advisory board, he has been involved in technical support, sales and marketing of various technologies for communications, automation, testing and troubleshooting of industrial and commercial systems for over 30 years.

How fiber optic systems work

By William Graham, CFOS/S/T/C

Let's look at a fiber optic (FO) system in its most basic form (Figure 1). The generally digital electrical signal is changed to a pulsating (digital) light signal, which is transmitted through optical fiber to the receiver, where it is changed back to an electrical digital signal.

An optical system consists of at least four parts:

- transmitter
- optical cable
- connectors and splices
- receiver

Were we discussing an electrical system, we wouldn't bother considering the connectors because the loss would be very low, or non-existent. FO systems are different in that every connector or splice represents a loss (which can sometimes be high) that must be considered as part of the *loss budget*. The TIA/EIA telecommunication standard for FO systems allows us a loss of up to 0.75db per connector pair that, while easy enough to achieve, is generally unacceptably high in practice. The installer generally finds that connector losses in the 0.2dB to 0.3db range are readily attainable.

The terms we use

Communication is the process of establishing a link between two points and passing information between them. Were we to wave to a person across the street, we would be communicating with them; we are establishing a link between two points, and passing information between them.

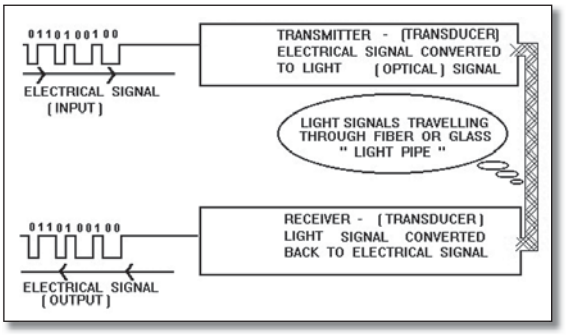
In electronics, the signal we send could be anything from modulated radio waves to digital pulses. The digital On/Off pulse could be Morse code being sent electrically along a wire. A modern version might be text-messaging on your cell phone through the air.

Encoding is the process of placing the information on a *carrier*. (Any signal can be encoded by placing it on a carrier.) *Air* is a carrier. When we speak, we put our code (our voice) into the air by vibrating our vocal cords. Were we to try to speak under water, we would be heard, though not very well. Water does vibrate or modulate as a good signal carrier does; air carries no information until we speak and vibrate our vocal cords.

We could try directing a beam of light or a steady sound from one point to another in an attempt to establish communication, but neither carries any intelligence until we encode in some way, causing either medium to vary in intensity or frequency, or simply turn On and Off.

The Morse code system of dots and dashes is perhaps the oldest and best example of encoding a carrier. The receiver separates the information from the carrier just as our ears separate vibrations in the air into nerve signals that, inevitably, have some meaning.

FIGURE 1



The ear is the *decoder*.

In fiber optic systems, light is the carrier upon which we impress our information.

Let's say we're writing a letter on our computer; the letters we press on the keyboard are encoded as digital pulses in a language the computer understands. When we finish, we send this letter to another person, who receives and reads it via their own computer.

To do this, we need a modem, which re-encodes our digital code into audio pulses that are sent over telephone lines to the other computer. The other computer's modem receives those pulses and changes them back into digital pulses that computer understands. The letter can then be displayed on-screen or printed.

The three most common ways to modulate a carrier are:

1. *Frequency modulation*, as in FM radio, where the carrier frequency is changed to correspond to differences in signal amplitude. The signal changes the frequency of the carrier rather than its amplitude.
2. *Amplitude modulation*, as in AM radio, where the amplitude of the carrier is varied to correspond with the amplitude of the information.
3. *Pulse-coded modulation (PCM)*, which converts an analogue signal—like our voice—to digital pulses.

We can represent our voice as a series of numbers, with the value of each number corresponding to the amplitude of our voice at any given instant. PCM is the main way voices are sent over fiber optic telephone systems.

The digital system employed consists of a series of ones and zeroes (1s and 0s) representing On and Off states of the pulse. A group of eight of these On/Off pulses are called a 'byte' of information, and we can describe 256 different conditions. Two bytes are capable of describing 64,000 different states, making the digital system a powerful and versatile way to send data over fiber optic lines.

William Graham is an electrical contractor, certified fiber optic specialist and a director of the Fiber Optic Association (FOA). He operates Mississauga Training Consultants and is a member of Network & Cabling's editorial advisory board. You can visit William online at www.fiberoptictraining.com.

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Vertical panel of LAN Mobile Radio (LMR) at U.S. Capitol Visitor Center.

Demand drives wireless installations

By Thomas Fox

Every day, businesses use wireless technologies to connect their employees with clients and the rest of the outside world. From enhancing cellular phone signals to tracking company assets, the use of wireless can greatly impact the way an organization does business.

A wireless infrastructure can be as simple as placing access points (APs) throughout a facility for laptop connectivity or as complicated as coordinating multiple wireless systems to work together. A distributed antenna system (DAS) can serve as the foundation for specialized wireless components. Then, depending on a business' needs and industry—including office, industrial, healthcare, retail or hospitality—specific applications, such as radio frequency identification (RFID), point of sale, and wireless temperature, humidity and carbon dioxide tracking, can be added to augment that company's services.

The advantages of wireless

The installation of wireless systems has changed rapidly. Only a few years ago, many facility managers wouldn't consider wireless applications. Today, a large percentage of those managers are running a host of apps over wireless networks. Past concerns regarding the interference of new systems with traditional wireless systems, such as telemetry, have been alleviated as systems became more integrated.

In retail, telemetry and RFID are used for tracking inventory. More critically, hospital telemetry systems are responsible for monitoring patient vital signs. In the past, those in charge of telemetry systems were convinced there were potential interference issues that could not be tolerated. These problems have been remedied by moving telemetry to new frequencies on Wireless Medical Telemetry Service (WMTS) that are not as susceptible to interference.

Giving off mixed signals

In today's 24/7 environment, even when a person is in a subbasement or the core of a large complex, he will still demand continuous cell phone coverage. As first responders arrive at the scene of an emergency, they need their radios to work. Until recently, low signals on mobile networks have been an issue in very large facilities, but companies are recognizing that wireless communications are necessary for customer, business and public safety convenience.

As a result, DAS has become a standard business application for wireless today. It consolidates wireless signals through antennas throughout a building. When connected to various wireless services—data and telecom systems such as WiFi, cellular phones and public safety, maintenance and paging radios—DAS takes signals from outside, boosting and rebroadcasting them throughout a building's coverage area.

DAS is most prevalent in the design stage of large headquarters and public buildings, particularly when those facilities will require several types of wireless networks and experience poor interior cellular signal strength. Depending on an existing building's design, DAS can usually be easily added, although the costs are higher than they would be with a new building in the design stage.

Traditionally, to achieve the same results as a DAS system, a building would need to have separate antennas for each cellular company, as well as separate antenna systems for WiFi and radio networks. Were wireless providers to change signals or new cellular carriers emerge, new equipment might need to be added to a building. Since DAS delivers all these signals via one main source, an adjustment only has to be made on one set of equipment at the head end and, potentially, at an electronic repeater, where the source signals are combined.

DAS can employ two different types of antennas. *Omni-directional* antennas are best placed in large areas that need 360° signal coverage, like in the middle of a warehouse. *Directional* antennas only send a signal in one direction, so they are best suited for spaces where the user wants to direct the signal and/or in smaller areas requiring high gain.

There are also two types of DAS: active

and passive. An *active* system has electronic repeater boxes in all the telecom rooms throughout a building, which receive signals from the head end or main telecom room. The boxes use fiber to carry signals from the base station equipment at the head end to the distributed antennas dispersed on the floors of the building. In many new buildings where DAS isn't integrated from day one, the fiber is still in place in anticipation of a wireless upgrade. Since newer facilities also have at least one telecom room per floor, DAS equipment is easily added to the space alongside network switching gear.

Passive DAS usually has only one set of electronic equipment in the main telecom room to filter and produce the signals sent through splitters, taps and cable. This type of system requires coax throughout the facility; a telecom engineer would be unable to use a customer-provided, pre-installed infrastructure, since coax is never installed ahead of time. Some older buildings have clear pathways below floors, above ceilings and at the head end, allowing for the addition of such cabling, but this is not always the case. In addition, simple considerations such as ceiling materials can impact the ability to create a passive DAS; when the ceiling is modular with panels, rather than hard, the available space for cabling is greatly reduced.

Realistically, the choice between active and passive systems boils down to customer preference and availability—or unavailability—of existing infrastructure. For new construction, it's critical for engineers to interview their clients at the start regarding the types of systems they want, then to work with architects to ensure the building is designed to accommodate those wishes.

So long as engineers know the wireless components that will potentially be used over DAS, they can plan a unique infrastructure tailored to the user's current and future needs. For example, VoFi (Voice over IP over Wi-Fi) takes a previously hard-wired system into the realm of wireless. Just as VoIP has transmitted phone calls over wired IP connections for years, VoFi takes it a step further, sending those calls out on a wireless IP connection. Using DAS for VoFi, however, could require tighter placement of wireless APs and antennas than a WiFi system for data. As such, adding VoFi to DAS when the system wasn't planned for it necessitates the addition of antennas and, possibly, APs at a later date. This is just one example showing why it is best to plan ahead.

Special wireless systems for special industries

Already familiar to those in the logistics industry, real-time locating systems (RLTSs) and RFID methods are increasingly being used in other sectors. Large businesses lose assets every year as inventory goes out the door and never comes back, and equipment goes into storage areas or is transferred to the wrong department. In many instances, the purchasing department will lease or buy more equipment even when it has ample supply (which has been misplaced somewhere in the facility). With an RFID tag on each one of those assets, management will know where they are at any given time.

RFID or RLTS works with a smart tag on each asset that sends out a wireless signal. One RFID system places exciters throughout a building to pick up the signal using an infrared system connected to a facility network. Other systems use the exciters to set off active tags that send a signal to a WiFi AP on the facility network.

Large installations have a server-based system tracking RFID tags. This server is separate from the WiFi server, but uses the WiFi APs to enter the network. Using a product such as Cisco's Wireless Location Appliance, both IT and asset management can be controlled from the same point. In addition to tracking the smart tag, an RFID platform can monitor historical location trends to determine whether equipment is consistently misplaced in the same area.

Industries such as retail, government and healthcare have begun using RLTS and RFID to monitor costly assets. In fact, healthcare is one of the fastest adopters of wireless technologies, as no other industry uses as many different wireless applications. They're using tracking systems to monitor wheelchairs that seem to always disappear, infusion pumps that tend to get misplaced. Additional applications geared toward hospitals and clinics include wireless clocks, temperature tracking and telemetry, in which measuring, recording and transmitting devices are connected to patients for monitoring their conditions and alerting staff to changes.

Retail outlets have adopted wireless point-of-sale (WPOS), as RFID has become a barcode alternative. A WPOS system uses hand-held devices to wirelessly communicate sales, orders and inventory to a base station on the central network. As such, it can reduce wait times in stores where items are scanned wirelessly; the information can either be transmitted to a fixed register while customers wait in line or credit card sales can be processed immediately on the device.

In some office buildings, wireless technology is also used to maintain employee comfort. Sensors throughout a space can wirelessly track indoor temperature, humidity and carbon dioxide levels to help the HVAC system maintain optimal conditions. Dedicated outdoor air (DOA) systems are becoming more popular as part of the sustainable building movement, so these types of sensors are becoming more prevalent. For example, DOA uses carbon dioxide (CO_2) to measure the quality of an indoor environment. When levels of CO_2 rise, other contaminant levels rise as well, so the system pumps more air into the space. Therefore, wireless CO_2 sensors can be used to transmit to the HVAC system how much ventilation air is required to maintain the best indoor air quality.

Cost versus potential

Some challenges must still be overcome with each wireless application. While most owners want to provide the most they can to their employees and customers, they are limited by what they can afford. Many times, extensive systems are sacrificed due to the cost; companies often include wireless in the design phase of a project only to take it out later when the full cost is understood.

Another important issue is determining who will be in charge of these applications. In many cases, the IT department overseeing these types of services are already overloaded and simply cannot take on yet another process, especially when an app covers millions of square feet.

Driving the installation of wireless systems is user demand. When the apps are seen as necessary for meeting the needs of the people—including those paying the bills and running the facility—then a business will be more likely to add them. In the end, producing a state-of-the-art facility is about looking into the future. When owners can look ahead, these applications will be added—either now or not too far down the road.

Thomas Fox is an associate with the Special Systems Design Group of RTKL Associates Inc., one of the world's largest architecture and engineering firms. He has worked in the wireless, networking and telecom industries for more than 15 years, specializing in healthcare and educational projects. He can be reached at tfox@rtkl.com.

Network design

By Karl Vancl

For today's security integrators, robust and proficient network design is the foundation upon which all successful subsequent network implementation is built. The various applications supported by today's networks are becoming increasingly diverse in nature and, in addition to traditional data flow, the modern network has become a transport mechanism for real-time applications such as video, telephony and other types of multimedia.

As a result of the diverse nature of these applications, network design has never been more complex and challenging. It is becoming essential for the modern security integrator to have a sound grasp on network design and follow a key set of principles when delivering a turnkey solution to the client.

Security-specific applications such as video surveillance and access control drive design requirements, while the network remains the framework that facilitates them. Without appropriate knowledge of the security apps, the network cannot be designed; it is essential, then, that the security integrator be an integral part of the overall network design and implementation process.

Performance starts with design

Today's networks can be thought of as belonging to two design categories: those that have been thoughtfully and purposely designed, and those that have merely been pieced together over time. The conspicuous difference between the two is the first is characterized by network predictability and consistency in relation to key factors such as performance, resilience, scalability and cost.

Whether the security integrator is building a dedicated security network or employing the client's existing infrastructure, consideration needs to be given to system layout and appropriate network topology. Apps such as streaming video require specific network parameters that exhibit consistent high levels of performance, and the integrator has to consider design constraints like latency and response time.

At this stage it is imperative to consult closely with the client to determine and verify the key expectations of both the security apps running on the network and the network itself. This should include dialogue about specific performance levels, such as latency (which can impact head end application control), as well as items such as video switching latency and availability.

Other factors to consider are the number of users the system will support and the necessary protocols and power requirements for deployment. Security apps are often mission-critical in nature, so the integrator needs to consider resilience and network performance during the design stage. The focus should be on satisfying performance-based criteria, such as high network availability, zero downtime, automatic failover and convergence time.

Security pros have long been selecting proved vendors and equipment to deliver solutions that are able to grow with their clients' needs. The same methodology should apply to network design. A robust, scalable network must be capable of supporting growth without the need for major overhauls. Considerations have to be made for the number of current users and system growth. Bandwidth requirements also need to be considered, as most security apps traditionally grow with facility changes. It is important for the integrator to determine whether the network is designed to handle additional nodes, devices and load without sacrificing the original design.

Meeting design objectives

To successfully meet network design objectives, professionals need to combine—and understand the relationship between—traditional, practical experience with a theoretical understanding of network interconnects. The integrator needs to review the parameters that were laid out in the design stage and apply these to actual physical deployment. Special attention should be paid to cabling, switch selection and quality of service levels required for successful app deployment.

for the security professional

The security design approach begins with identifying particular deliverables that are required by the client. This high-level approach determines the number of end-point devices, such as video cameras and access control points, and helps determine and shape the overall solution and system layout (centralized or edge concept). The process then further refines the criteria into particulars, such as image resolution of each camera, the number of images per second required at the recorder and at each display station.

Considerations also have to be made for the number of users accessing each device or station in the overall system, and how control will be distributed among the application and network. Once these criteria are finalized, bandwidth calculations and mapping can begin. After figures are calculated, they are used to shape the network layout based on criteria such as number of ports needed, bandwidth and power requirements, and the particular protocols that will be required. Equipment selection can then take place.

Since a network can comprise copper or fiber cabling—not to mention wireless components—the overall design of the wiring plant needs to conform to standards and best practices as it relates to connections, cable paths and power. Cabling should be carefully specified to meet current and future standards, and particular attention should be given to achieve these. Cat 6a (augmented Cat 6 cabling) is a popular cable standard and is useful for network speeds up 10G. The installation of cabling should also conform to standards such as TIA/EIA-568A and its subsets.

When deploying network switches, the integrator should consider both physical network layout as well as the requirements of the security apps. Network switches are traditionally split up into three distinct categories: core, aggregate and edge. *Core* switches are centralized and provide higher management functions. *Aggregate* switches manage *edge* switches and provide a communication point between the core and the periphery. Finally, *edge* switches support the various network-

enabled devices such as video cameras, access control readers and telephones.

An important feature of edge switches is the ability to deliver power to end-point devices. The PoE standard IEEE 802.3af delivers up to 15W of power via two of the four available pairs of wire in the Cat 5/6 cable. This allows the integrator to provide power to video cameras and access control points via the switch, reducing cabling costs and allowing for centralized power distribution.

This type of deployment has the inherent benefit of providing backup power for mission-critical hardware when a UPS system is employed in conjunction with PoE. This is an important security deployment, as it allows for critical security services to operate even when the facility itself experiences a power loss. It is worth noting that a new PoE standard (IEEE 802.3at) is being developed to provide support for greater power requirements of up to 24W, which will assist with the greater deployment of end-point security devices such as outdoor PTZ (pan-tilt-zoom) cameras.

As for actual support protocols, it is very common for manufacturers of network security products to send video via the UDP protocol to minimize packet loss, so the chosen transport mechanism must be capable of correctly routing video as well as providing quality of service (QoS) levels to ensure delivery.

This stage also marks the identification of any design constraints such as budget, implementation timescale, support of legacy equipment, and security and network policy.

A word on network security

Network security for the security network should be a requirement—not an afterthought. Organizational security policies governing access and usage must be able to permit users but be robust enough to keep out unwanted traffic. These policies should not only reside on the application side but be an integral part of the network infrastructure itself, as each and every network device plays an important role in securing the overall network.

Some of the security options that need to be factored while designing a network are items such as VLANs, which can separate out the network into its own segment accessible only by the designated end stations. VPN tunnelling should be strongly considered when remote access by users is a necessary component, and encryption and authentication should be a requirement for end-point devices (such as video cameras and network video recorders).

Lastly, there should be a disaster recovery plan for preventing accidental data loss. When selecting equipment from a reputable security manufacturer, the integrator needs to keep in mind that periphery devices should be able to retain data in case the network intermittently fails. This can come in the form of on-board device storage, such as SD memory in video cameras.

Network design for the security professional involves balancing priorities and addressing a range of technical issues and constraints while dealing with various tradeoffs to deliver a robust turnkey solution to the client. It takes a variety of different specialties and strengths to deliver this type of solution, which is why it should be a collaborative approach between differing individuals, skill sets and departments.

Karl Vancl is the western regional account manager, Professional Imaging & Display Solutions, for Panasonic Canada Inc. He can be reached at kvancl@ca.panasonic.com.

What's in a l

Updated ANSI/TIA/EIA-606-B standard adapts for pre-terminated installations

By Todd Fries

What is the world coming to? At least, what is the world of communications infrastructure coming to when we are actually consider the advantages of a pre-terminated cabling installation? As these types of solutions gain in popularity, the labelling standard must adapt to consider how to administer and document a pre-terminated world.

Given that industry standards allow a break or consolidation point, the idea of bringing a pre-terminated solution to the workplace is gaining momentum. Basically, by employing a consolidation point, the installer or end user only needs to manage the last section of cable for future MAC (moves, adds and changes, a.k.a. *churn*), which has historically been very costly. (The current cost of churn per port can be as high as $250, whereas churn in a pre-terminated installation could be as little as $80 per managed port.)

The difference in cost is based on the way the infrastructure is managed, labelled and recorded. A significant effort is involved when a contractor has to pull cable all the way from the telecom room to add/change ports in a work area; over time, increasingly more cables are abandoned in the plenum space or floor cavity, making a jungle-like mess of the original infrastructure.

With pre-terminated solutions, the main cabling can be run from the telecom room to consolidation points at key locations within the work area. In essence, the end user is now creating 'zones' within the infrastructure that must be managed and documented using the new ANSI/TIA/EIA-606-B labelling standard.

A zone might be defined as the fixed length of cable (pre-terminated) that runs from the rack to the consolidation point in the work area. It is here that the customer can re-define work stations, ports and data points through a series of well-planned break points that can be managed easily (and from within his own organization). A second zone is the pre-terminated cabling that runs from the consolidation point to the work area.

Addressing work areas zones

TIA-606-B addresses this scenario in a logical, simple format. First, the zone that runs from the data centre to the work area has to identify the origination point on the rack or cabinet. The standard allows for this in several ways.

- The *grid* location of the rack or cabinet within a specific space.
- The *row and rack* location within a specific space.
- The *rack number* within a specific space.

Not all data centres or spaces work using grid coordinates, so a simple rack or row location will suffice. As an example, a rack in space 'A' on the first floor is located at grid location FD12. This is printed on the label like this:

```
1A-FD12
```

This could just as easily have been written as:

```
1A.1
```

which would be read as "Rack 1 in Space A on the first floor".

The next step is to add the location of the patch panel within that rack. This can be done by simply using alpha characters, starting with 'A' at the top of the rack and working downward (excluding wire managers and, typically, the letters I, O and Q).

So we can expand our label information by adding the rack location, which can also be listed using RUs (rack units) starting from the bottom of the rack or cabinet. In the following example, we're talking about a patch panel located 42 RUs from the bottom of a cabinet, located at grid location FD12 in Space A on the first floor:

```
1A-FD12-42
```

Finally, for our pre-terminated cassette, we can specify a subpanel within that patch panel, which will identify one end of our pre-term solution. So, when the cassette is located in subpanel B of the patch panel located 42 RUs from the bottom of a cabinet located at grid location FD12 in space A on the first floor, our identifier expands to read:

```
1A-FD12-42:B
```

You can see a pattern emerging; the only thing missing is the range of individual ports for a cassette:

```
1A-FD12-42:B.01-12
```

The idea is to identify the zone from the rack to the work area so that anyone reading the label can identify and trace the other end easily and quickly. The balance of this equation is that we need to identify the consolidation point defining the other end of this cable.

Identifying the other end

When it's a copper consolidation point, it might terminate as six individual ports, or it might terminate in 12 LC connectors when

abel?

it's fiber. Either way, the break point must be identified, and the easiest way is to simply use this same identifier on each end of the cable run. It should be marked with a label within 12 in. of the end of the consolidation point and at the back of the patch panel.

While this first zone is typically 'fixed' in a pre-term solution, it need not be; it, too, should be addressed for future MAC. This eliminates the problem of abandoned cables in the plenum as new cables need not be run when churn is required. This represents a significant saving in the cost of ownership in that only the last bit of cable has to be manipulated or changed.

The second zone is the cable that runs from the consolidation point to the work area. In this case, we want to be able to create a link that can be traced all the way back to the rack or cabinet. Technically, this becomes a horizontal link and should be labelled as such:

```
1A-FD12-42:B.01.CBL
```

This identifier tells us this horizontal link is connected to port 1 of subpanel B in a patch panel located 42 rack units from the bottom of a rack at grid location FD12 in space A on the first floor. It could also be written:

```
1A.1-42:B.01.CBL
```

Since the 1A is not required when the installation is inherently simple, we can reduce this identifier even further:

```
1-42:B.01.CBL
```

In the next example, the copper pre-term cable running from the telecom room to the consolidation point is marked or labelled as:

```
1A-FD12-42:B.01-06
```

Each of the six horizontal links running from the consolidation point to each work area might be labelled:

```
1A-FD12-42:B.01
1A-FD12-42:B.02
1A-FD12-42:B.03
1A-FD12-42:B.04
1A-FD12-42:B.05
1A-FD12-42:B.06
```

(This could also be listed as 01-12 for fiber ports or 01-24 for fiber strands.)

Again, there is traceability all the way back to point of origin using the TIA-606-B labelling standard.

What's in a label?

The control and cost savings are significant, and the ability to identify and document the infrastructure is key. When looking at the overall solution—both the method of designing the infrastructure combined with a logical way of identifying and record that installation—allows for greater savings in installation costs and subsequent MAC.

In many cases, using consolidation points allows the customer to make simple changes quickly. When they add or change anything, it's up to the customer or the responsible contractor to update, add or change the documentation.

The documentation for the TIA-606B infrastructure can be recorded in a simple Excel, Access or Dbase program for future use. So long as the identifiers in the zone extending from the data centre/space to the consolidation point are accurate, they should never have to change; the only thing that should change is any work area churn, which is to be expected as business needs expand.

TIA-606B is the culmination of years of work by many experts, installers, engineers and customers; while many elements remain to be addressed, the standard is garnering global attention. It not only affects our local world, but will soon influence international markets. It is a standard that will continue to develop and change the way we think about administration and labelling.

Todd Fries is marketing manager of identification systems with HellermannTyton in Milwaukee, Wisc. For more information, visit www.hellermann.tyton.com.

CALENDAR

Digital Home Ecosystem Forum
December 3
Cincinnati, Ohio
Visit www.caba.org/connectedhome/ecosystemforum.html

BICSI Winter Conference
January 19-22, 2009
Orlando, Fla.
Visit www.bicsi.org

SCTE Canadian Summit 2009 (inaugural event!)
February 3-4, 2009
Toronto, Ont.
Visit www.scte.org

ACUTA Annual Conference & Exhibition
April 19-22, 2009
Atlanta, Ga.
Visit www.acuta.org

Security Canada East
April 21-22, 2009
** Location TBA*
Visit www.securitycanadaexpo.com

BICSI Spring Conference
May 11-13, 2009
Baltimore, Md.
Visit www.bicsi.org

Canadian CommTech Show & Seminars
May 13-14, 2009
(Charity Golf Tournament May 12)
Kelowna, B.C.
Visit www.commtechshow.com

Interop Las Vegas
May 17-22, 2009
Las Vegas, Nev.
Visit www.interop.com/lasvegas

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Total care: integration paves way for state-of-the-art healthcare facility

Woodstock General Hospital (WGH) recently broke ground on a state-of-the-art healthcare facility in Woodstock, Ont. At three-storeys high with a 178-bed capacity, the new building will replace the city's existing 113-year-old hospital—more than doubling the available square footage and creating a better environment to serve the healthcare needs of local residents.

The driving force behind the project is Integrated Team Solutions (ITS)—a consortium of companies that signed a $268.7-million contract to build, finance and maintain the new facility. The work falls under the Ontario government's Alternative Financing and Procurement (AFP) model.

Honeywell—a member of the consortium and player in the design and maintenance of the facility—will deliver a Total Asset Management (TAM) program as part of the ITS contract. Under the program, Honeywell will provide service, maintenance and security for the facility for the next 30 years. It will also help design and install the building automation, security and life safety systems.

The Honeywell program and overarching consortium is geared toward delivering a hospital that is built to Leadership in Energy and Environmental Design (LEED) certification requirements. The facility will also leverage the latest building systems to meet regulatory and security requirements critical to the healthcare industry. This will enable hospital administrators to focus on employing the best clinical team.

Integrated and reliable

The centre point of the new facility is its integrated network of building systems, which will communicate over a reliable IP communications network. This includes building automation, energy management, closed-circuit television (CCTV) surveillance, security management, access control, fire alarm, lighting control, infant protection, nurse call and bedside terminal equipment.

The integrated network will enable the systems to effectively talk to each other and share information. Honeywell Enterprise Buildings Integrator (EBI)—a facility management platform—will facilitate this integration and provide a cohesive, detailed view of all building technology.

Specifically, EBI will control comfort, air quality and energy use to help achieve the building's LEED certification. It will also assist administrators with meeting the complex regulatory requirements designed to keep patients and staff healthy, safe and secure. For example, administrators can use EBI to validate critical temperatures in laboratory environments or monitor air quality levels to ensure safe surgical operating environments. EBI also provides the tracking and reporting necessary to verify compliance with healthcare standards.

Honeywell will also install the building automation, access control and CCTV surveillance systems. And, like EBI, all building subsystems will be IP-compatible and connected to data closets located throughout the facility. The company will also use secondary tier networks comprising unshielded twisted pair (UTP) cabling to connect field devices. The CCTV system will be IP straight to cameras utilizing PoE technology. (As for the IPC network, Honeywell will use the communications backbone, but is not deploying the actual network. The hospital is currently in negotiations for the network deployment.)

All systems will be capable of sharing information to provide enhanced functionality for the hospital and its staff. Examples include:

- Critical building systems are monitored continuously by the building automation system, which will report any failures immediately to the 24-hour security desk and wirelessly to building operators via their mobile phones.
- The surveillance system is integrated with a number of subsystems to provide instant video coverage in the event of alarms, such as a forced door or infant protection alarm. This allows security staff to quickly pinpoint the nature of the event, and react quickly and efficiently.

- The nurse call system is integrated with the security management system to provide immediate notification of code alerts.
- The building automation, lighting and energy metering systems will be used to determine the optimal use of building equipment and reduce energy consumption. By actively metering the consumption of utilities, EBI is able to lower the energy use of non-critical systems during periods of peak consumption.

To accomplish the required exchange of data, the architecture relies on a number of open protocols. The building automation system uses BACnet and LonWorks protocols so that field devices and other equipment can be seamlessly integrated. The access control system uses LonWorks and Wiegand input modules, and the surveillance system uses IP communication and MPEG-4 compression. Other systems—such as lighting controls and bedside terminals—are pulled in via OPC and Modbus protocols.

EBI acts as a 'brain' for the building, pulling data from all of the subsystems and providing information to users in a common workstation. All systems are monitored 24/7 by the Honeywell Global Service Response Centre. Any failures or alarms are logged and facility personnel can immediately take corrective actions.

There are significant advantages to this type of integrated approach. In the past, each system would have its own communication wiring, server, workstation software and communication protocols. By using a common platform like EBI, all communication is hosted on the building's IP network, which is backed up by UPS equipment and diesel generators. Another benefit: facility personnel only need training on the EBI system since all data is presented through a single workstation. Plus, systems and devices are easily upgraded throughout the life of the building because of the open architecture.

Managing future success

Once construction is complete, Honeywell will be responsible for facility management and physical security for the next three decades, lowering typical hospital operating costs. This includes all mechanical and automation equipment service, building envelope repairs, infrastructure upgrades and replacement, security personnel staffing and management, and grounds work.

In addition, Honeywell will measure the baseline energy consumption of the hospital for the first two years, and develop and implement strategies to maintain or lower those levels for the rest of the contract. This ensures the hospital will tightly manage utility costs and help minimize its ecological impact.

To ensure it delivers on its objectives for the new hospital construction, Honeywell has committed to strict performance indicators outlined in the agreement. For example, given the precision needed in a healthcare environment, the company will maintain temperature controls within a half degree of set points. It also will thoroughly inspect and recalibrate critical building equipment on a monthly basis.

The hospital is expected to be built by summer 2011 and Honeywell will assume maintenance and security responsibility at that time.

852 Series Ethernet switches

Wago says its 852 Series of Ethernet switches provide a range of scalable solutions for network infrastructures. The series encompasses simple Ethernet switches to configurable, multi-function communication switches. Units in the series range from the 101 (a 5-port 100Base-TX industrial switch) to the 104 (a 7-port 100Base-TX plus 2-slot 100Base-FX industrial managed switch). With LEDs indicating operational status, the 852 Series has an operating temperature of 0°C to 60°C, resists vibration and shock (good for industrial environments), and is compatible with other Wago Ethernet solutions, such as the 750-975 RJ-45 Ethernet connector and 289 Series of DIN-rail mountable interface modules. Electrical characteristics include function monitoring and redundant voltage supplies ranging from 9V to 48V.

WAGO CORP.
www.wago.us

Fluke ScopeMeter 225C and 215C for Fieldbus testing

Fluke recently introduced two new models—the 225C (200MHz, 2.5GS/s) and 215C (100MHz, 1GS/s)—to its range of Color ScopeMeter test tools with automated test capability for Fieldbus, ProfiBus and other industrial communication protocols, plus all the features of the 199C and 196C ScopeMeters. The instruments feature easy signal validation of all critical signal parameters, like amplitude and noise, and have floating and fully isolated inputs for true differential signal measurements on two-wire differential bus systems. Bus Health Test analyzes the electrical signals on the industrial bus or network and gives a Good, Weak or Bad validation mark for each relevant parameter (next to the actual measured value). They can validate the signal quality as soon as electrical signals are passed along the network, and help find errors like improper cable connections, bad contacts, incorrect grounding and missing or superfluous terminators.

FLUKE ELECTRONICS CANADA
www.flukecanada.ca

Powerware 9395 825kVA UPS system

Eaton Corp. boasts its Powerware 9395 825kVA UPS (uninterruptible power supply) offers greater than 94% efficiency across a wide load range. Its Hot Sync technology allows UPSs with different power ratings to be paralleled together, providing a scalable and adaptable architecture. Wireless Paralleling technology allows each UPS to work autonomously without centralized controllers or control wiring, and the 9395 can be field-upgraded by adding additional modules to achieve N+1 redundancy or additional capacity. A transformerless design results in a lower weight and footprint, and the EZ Capacity Test can test full systems without using external loads or load banks.

EATON
www.powerware.com

netSELECT 2-in. enclosure extension brackets

Hubbell's netSELECT 2-in. extension brackets increase capacity and enable enclosures to accommodate networking and A/V equipment installations requiring heat dissipation. With welded construction, they require no assembly and, when attached to the face of an enclosure, extend the cabinet door out two inches. With louvers on the top and bottom, the panels feature multiple knockouts for cable entry/exit and to accommodate a WiFi antenna attachment The brackets also allow an enclosure to hold variously sized components, such as switches, routers or audio amplifiers. They can be used with either 14-in. or 28-in. high enclosures.

HUBBELL WIRING SYSTEMS
www.homeselect.net

12-Port wireless LAN switch

Belden's new 12-port wireless LAN switches (BWS-8008, BWS-8012 and BWS-8024) are part of the Belden Wireless Solution: a Layer-2 Edge Architecture/Channel Blanket system. They take care of the IP-packet processing of all wireless communications, creating multiple 'channel blankets' to deploy any number of Belden XtraThin access points (APs), and can be used alone or in a daisy-chained network configuration. They also meet all applicable industry standards for WLAN and Ethernet connectivity, and have built-in PoE. The channel blanket solution uses scheduling algorithms to allocate capacity to clients, allowing the same channel to be transmitted from every AP in the system without co-channel interference.

BELDEN
www.belden.com

Clarity maximum-density patch panels

Ortronics/Legrand's Clarity 'maximum-density' (MD) patch panels offer a solution for high-density applications; they provide 48 ports of Clarity 6 or 5e performance in 1 RU (rack unit), and are ETL tested and verified to TIA Cat 6 and 5e component specs. They are tuned using Ortronics' 'centre-tuned'

technology for improved crosstalk and return loss performance, the company says, that is field measurable in the link or channel. Clarity MD patch panels are icon-compatible for easy port identification, and feature universal TIA 568A/B wiring and support standard 110 termination practices. In addition, they are RoHS compliant. Standard Cat 5e and 6 MD panels come supplied with 24 rear-loading dual-port termination modules to service 48 ports. To support field-configured installations, individual dual-port jacks (in a range of colours) and unloaded panels are available.

ORTRONICS/LEGRAND
www.ortronics.com

Standard/combination Audacious sound cables

Honeywell's new Audacious sound cables are available in standard 14-16 AWG stranded designs with two or four conductors, or in a combination cable with 16/4 high-strand, oxygen-free copper combined with 24/4 pair Cat 5e in a Siamese construction. A high strand-count increases flexibility and frequency response, says Honeywell, while easy-to-read legend markings for channels, rooms and zones helps ease installation. The loose-tube jacketed cables are lightweight, simple to strip, and come in a variety of colours to simplify identification. Installation is made easier with reel-style or tangle-free boxes in lengths of 500-ft or 1000-ft.

HONEYWELL
www.honeywellcable.com

J-Hook support solution

Featuring a wide base with smooth, beveled edges, Erico's Caddy Cat Links J-Hook can be used for a variety of cable, including large-diameter cable and Cat 6a/Cat 7. This J-Hook offers the largest bending radius of any J-hook, boasts Erico; it's UL listed with metal bail snaps, comes in 1-in., 2-in., 3-in., and 4-in. sizes, and accommodates many attachment methods, such as threaded rod and wall mount. The J-Hook is also recyclable, saving up to 80% more raw material than tray systems, says the company.

ERICO
www.erico.com

ACM4 access power controller

Altronix's ACM4 access power controller is designed for a variety of smaller control applications. It distributes 12/24vAC or vDC over four independently controlled Fail-Safe and/or Fail-Secure outputs to power and control electric strikes and magnetic locks. The fire alarm interface is field selectable for any/all outputs with individual LEDs indicating lock status. The ACM4's four independently controlled, fused or PTC-protected outputs may be employed as dry-form 'C' contacts; these outputs can be activated by an open collector sink or Normally Open (NO) dry-trigger input from an access control system, card reader, keypad, push button, PIR, etc. The unit is designed to be powered by one common power source (which provides power for both the unit's operation and locking devices) or by two totally independent power sources; one to operate the unit and the other for lock/accessory power.

ALTRONIX
www.altronix.com

D2-HB surveillance camera enclosure

Dotworkz's D2-HB is an all-weather version of its D2 surveillance camera enclosure, which has a thermostatically controlled heater-blower system that prevents IP cameras from being damaged by weather extremes. The D2-HB includes all the legacy features of previous models and is engineered for conditions ranging from -9°C to 41°C. The unit's heater is automatically activated at 4°C and deactivates at 15°C, with a thermal cut-off assuring safe heating operation. The enclosure is rated IP65 and NEMA 4X, and its blower remains On at all times, ensuring that the camera is kept cool and fog free. A polycarbonate thermoplastic housing and impact-resistant lens protects the unit, which also includes an onboard network video recorder, routers, cell networks, hard drives, UPS, WiMAX, and mesh hardware.

DOTWORKZ
www.dotworkz.com

NxtGEN update, LEED and more

By Richard S. Smith, RCDD/NTS/OSP Specialist

It's an exciting time to be a BICSI member. Since the recent conference in Las Vegas, there has been a veritable flood of news regarding BICSI's outreach efforts and education initiatives, including the NxtGEN Program timeline.

NxtGEN

NxtGEN started a couple of years ago under the name 'Inverted Funnel Project' when BICSI's board asked a number of members and volunteers to look at the many changes occurring in the industry since the RCDD program's inception, then suggest enhancements. The result is NxtGEN, which aims to:

- elevate the importance and recognition of existing RCDDs (Registered Communications Distribution Designers);
- make the RCDD and BICSI specialty programs (Wireless Design [WD], Outside Plant [OSP] and Network Transport Systems [NTS]) more inclusive of IT, engineering and other professionals; and,
- modernize the BICSI credentialing programs to make them more consistent with how professionals are credentialed today.

The NxtGEN Program fulfils two of the four main goals within BICSI's strategic plan. The Credential Goal calls for BICSI's credentials to be regarded as the most coveted and premiere designations in the ITS (information transport systems) industry. The Knowledge Transfer Goal aims to see BICSI become a globally valued resource of information, insight and learning opportunities.

And things are kicking into high gear. In January, the ITS Design Fundamentals Program will be unveiled at the Winter Conference. It will allow students to take electronic exams (based on self-study) in preparation for the proctored specialty exam. By May 2009, the specialty exams will be offered to individuals without requiring them to possess the RCDD credential. September 2009 will see the publication of the Telecommunications Distribution Methods Manual (TDMM, 12th ed.), and January 2010 will see the first RCDD exams based on the new NxtGEN prerequisite qualifications being administered.

BICSI and LEED

BICSI is working with the U.S. Green Building Council (USGBC) to develop strategies for recognizing technology infrastructure-related innovation credits in the Leadership in Energy & Environmental Design (LEED) Green Building Rating System. USGBC is a non-profit, membership organization whose vision is a sustainable built environment within a generation.

During a presentation at the 2007 BICSI Fall Conference, fellow Canadian Bill Weekes, RCDD, CET, presented important issues surrounding this very topic. While it is true there is no official requirement for communications within the LEED process, there is a growing expectation on the part of architects and consulting engineers that RCCDs working on their design projects bring solutions to the table in keeping with LEED's core principles.

Reps from BICSI—including president Edward J. Donelan and president-elect Brian Hansen—met with USGBC's Brendan Owens, vice-president of LEED Technical Development earlier this year to create an awareness of ITS industry manufacturers and contractors that have products and processes that could apply for LEED credits, but only if technology credits were to be made a part of the existing rating system. On USGBC's advice, BICSI created a consortium to create the necessary technology credits. It comprises: Hansen as chair; Dave Labuskes (RTKL Associates Inc.); Betty Bezos of Bezos Technologies; and Ed Mikoski, vice-president, standards & business development for TIA (Telecommunications Industry Association).

Mikoski was added because he helped create an international green manufacturing certification program with the Electronic Components Certification Board (ECCB), which is expected to be coveted throughout the industry once technology credits are established in LEED.

The consortium has already made suggestions as to where technology credits could be included in the Innovation in Design section of the 2009 LEED rating system. At its meeting at the Greenbuild International Conference & Expo in November, the consortium will start work on the technical writing for these valuable technology credits.

Returning for another term

Finally, a big thanks to all the members who voted in this year's board of directors election. Your support is greatly appreciated and, as I am returning as Canadian Region Director, I will do my very best to continue representing your concerns and directing BICSI initiatives with your interests in mind.

BICSI bylaws limit elected officials to two consecutive terms and, beginning next year, I will be entering my second and final term. So I urge you, if you've been a member for at least the previous 24 consecutive months, to consider becoming the next Canadian Region Director. Having held the position for almost two years, I can assure you there are immeasurable benefits. If you're interested, **please contact me** so we can talk more about what the experience holds for you. It's truly been a rewarding and exciting part of my BICSI membership.

Richard S. Smith—the manager of Bell Aliant Cabling Solutions—is the Canadian Region Director for BICSI, a professional association supporting the information transport systems (ITS) industry—including designers, installers and technicians—with information and education. Visit BICSI online at www.bicsi.org.

Hats off to new Canadian BICSI credential holders!
Canadians who have acquired BICSI professional accreditations during 2008 (up to November 1).

RCDD
- Mathew Cook
- Dario DiCarlo
- Dwight D. Kucharik
- Amanollah Mohsenipour
- Alain Nkenda
- Josie Penuliar
- Xiaodong (Tony) Shen
- Patrick Sum
- Tommy Tsz Chun Chiu
- Matthew Westerberg

OSP
- Richard Brunet

WD
- Theo Lammers

ITS Installer 1
- Tyler Busse
- Darren Cook

ITS Installer 2
- Alexandre Boyer
- Paul Dagenais

ITS Technician
- Chris MacIntyre

IEEE reduces PoE+ power requirements while TIA develops power delivery guidelines

By Marilyn Michelson

Are you interested in how much more power PoE (Power-over-Ethernet) is going to deliver over your cable? The Institute of Electrical and Electronics Engineers' (IEEE's) standard 802.3at (Power-over-Ethernet Plus/PoE+) originally wanted your cable to support a minimum of 30W of power at the powered device and physical interface (PD and PI), but it has since reduced that to a minimum of 24W.

The change occurred earlier this year, and it came about for a reason. You see, when it published the first PoE application standard (802.3af) in 2003, IEEE stated the cable would support 12.75W of power. Then PoE+ (802.3at) came on the scene to handle more power (the '+' meaning 30W), but datacom cables were unable to carry very much power (unlike a building's cabling systems). IEEE realized that a drop in power likely would not hamper PoE applications (such as surveillance cameras or VoIP phones), so they reduced the power requirement to 24W.

Here's a general idea of how PoE serves wireless capabilities. (Remember that the access point [AP] has to be wired back to the network but, from the AP out, the service of choice is wireless.)

TIA's new Technical Services Bulletin

TIA is developing a new document entitled "Guidelines for Supporting Power Delivery over Balanced Twisted-Pair Cabling" (Technical Services Bulletin [TSB] 184) that, to some extent, relates to PoE+. It specifies generic balanced twisted-pair cabling (on the premises) that will support the delivery of SELV (safety [safely separated] extra-low-voltage) power to DTE (data terminal equipment) at the same time data is being transmitted.

The document is still in development, but it will not provide safety requirements. It won't require anything—it's providing "guidelines". It is simply meant to help you by providing additional information so you can bring in remote powering over the structured cabling that's already installed—or going to be installed—in a building (per the TIA 568 series).

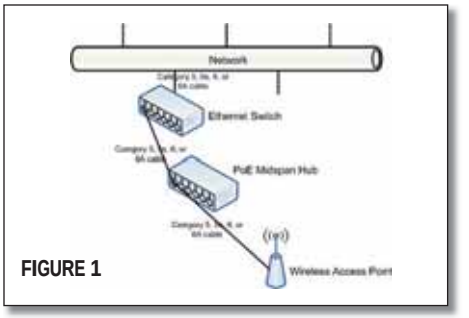

FIGURE 1

PoE Configuration © M. Michelson, BCS

TIA found that some enterprises use equipment at locations where local power might not be provided. Since IEEE was developing its PoE+ standard to work with what customers used (Cat 5 and/or higher)—which was less demanding than originally thought—IEEE wanted the 'How To' information regarding the power-carrying ability of certain cable made very clear. This would help with emerging applications using the remote power feature. (Note that TIA recommends this for Cat 5e or higher-performance cabling.)

Here's a list of influences TIA sees affecting 802.3at power delivered over cable:

- Surrounding environment's ability to dissipate heat generated by applying remote power to the cable.
- Room temperature along the cabling link.
- Tight cable bundling.
- Cable in a closed environment (i.e. conduit).
- Rise in temperature of the balanced cabling's copper conductors when remote power is applied.

In its TSB, TIA is including "recommended installation guidelines" in an Annex. Also, the TSB ensures that structured cabling installations meeting TIA 568-C.1 with a maximum cable bundle size of 100 cables, along with meeting TIA 569-B, will function properly for data and power delivery, and that no additional spacing or separation requirements are needed for the cabling supporting DC power. The TSB explains End-Point and Mid-Span DC Power Sources, and recommends using Cat 5e cable. (It will soon have specs for Cat 6 and 6A cable.)

Heat and current-carrying capacity

Heat is always a problem. The TSB goes over calculating a link's maximum current capacity, and advises using the maximum ambient temperature along the link as the basis for that calculation. There will also be a table showing the current capacity per pair for different temperature (in ºC) rises in 100-cable bundles of Cat 5e, 6 and 6A cables with all four pairs energized. (Note the temperature rise in cable bundles in enclosed spaces could be higher.)

This TSB is extremely helpful for understanding how rises in temperature occur for cabling, and how that rise affects current-carrying capacity. Why pay attention to current-carrying capacity? Because it's related to other aspects of an installation, including:

- HVAC loading within a premises
- Reduction in the overall cost of delivering power
- Transmission performance
- Operation in higher ambient temperatures (without exceeding the cable rating)

The first and second items above can be considered 'green' aspects of controlling temperature rises, so there are definite benefits to understanding the relationship between the current-carrying capacity of cable pairs and temperature. Watch as TSB 184 develops, because it will help you implement PoE+.

Marilyn Michelson (randm@volcano.net) of Business Communication Services writes articles, standards update reports and training materials, and provides industry guidance at www.bcsreports.com.

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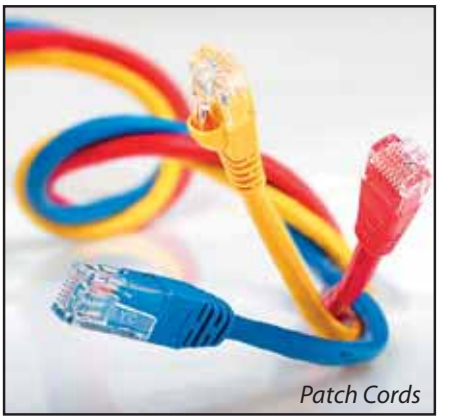
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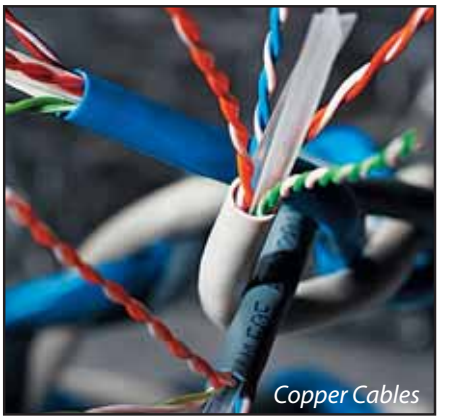
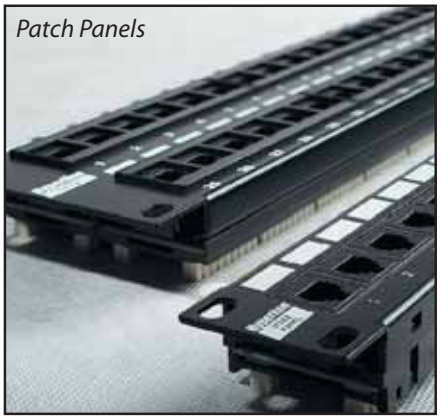
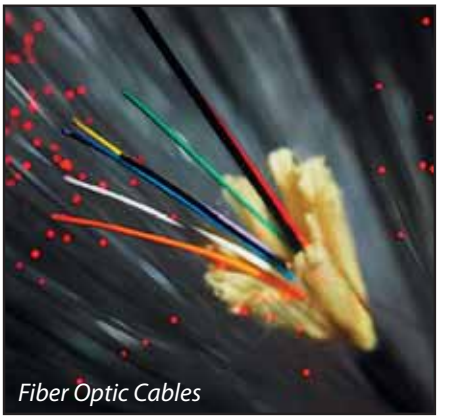
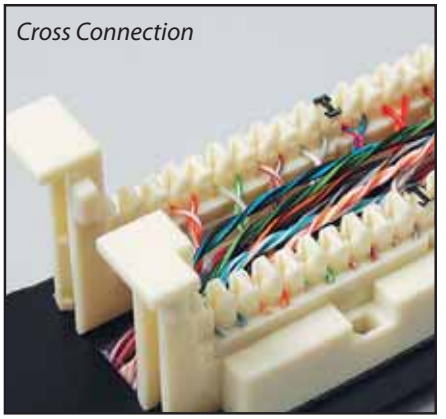

Copper Cables


Patch Panels

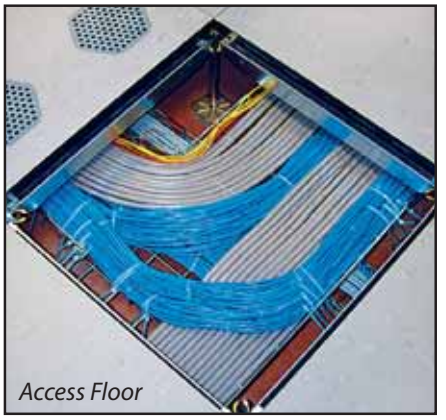

Fiber Optic Cables


Optical Connectors


Cross Connection


Cable Trays


Installation Accessories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